

CLAIMS

1. Noble metal nanoparticles having a mean particle diameter of 20 nm or less, the nanoparticle comprising a noble metal component and further comprising at least one type of a nitrogen containing organic component and a sulfur containing organic component.

2. The noble metal nanoparticles according to claim 1, wherein the noble metal component is at least one type of noble metal.

3. The noble metal nanoparticles according to claim 1, wherein the noble metal component is at least one type of Au, Pt and Pd.

4. The noble metal nanoparticles according to claims 1, wherein the metal component content is 60 wt.% or more.

5. A method for manufacturing noble metal nanoparticles having a mean particle diameter of 20 nm or less by heating in the presence of an aliphatic amine a quaternary ammonium salt type noble metal complex compound represented by the general formula $[R^1R^2R^3R^4N]_x[M_y(A)_z]$, wherein R^1 to R^4 are the same or different and each is independently hydrocarbon group

which may have one or more substituent groups; M is at least one type of noble metal; A is a thiolate ligand; x is an integer larger than 0; y is an integer larger than 0; and z is an integer larger than 0.

6. The manufacturing method according to claim 5, wherein the aliphatic amine is represented by the general formula R^5NH_2 , R^6R^7NH , or $R^5R^6R^7N$, wherein R^5 to R^7 are the same or different and each is independently straight chain alkyl group having 8 to 20 carbon atoms which may have one or more substituent groups.

7. The manufacturing method according to claim 5, wherein the quaternary ammonium salt type noble metal complex compound and the aliphatic amine have a mole ratio of 1:1 to 3.

8. The manufacturing method according to claim 5, wherein if the mixture of the metal complex and aliphatic amine at a mole ratio of 1:1 to 3 is subjected to thermogravimetric analysis, the heating temperature is in a temperature region such that the weight loss percentage is 1 to 50%.

9. The manufacturing method according to claim 5, wherein heating is conducted in an inactive gas atmosphere.

10. Noble metal nanoparticles having a mean particle diameter of 20 nm or less, the nanoparticles being obtained by the manufacturing method of claim 5, comprising a noble metal component and further comprising at least one type of a nitrogen containing organic component and a sulfur containing organic component derived from the aliphatic amine and the quaternary ammonium salt type noble metal complex compound.